

What is claimed is:

1. A DC-DC converter control circuit, comprising:
 - a first switching element having a first terminal to which a first voltage is supplied and a second terminal which is connected to an output node;
 - a second switching element having a first terminal which is connected to the output node and a second terminal to which a second voltage lower than the first voltage is supplied; and
 - a control circuit which outputs a first control signal to a control terminal of the first switching element and outputs a second control signal to a control terminal of the second switching element so as to control on/off states of the first switching element and the second switching element, wherein the control circuit switches the second switching element from the off state to the on state after detecting that the first switching element is in the off state when switching the second switching element from the off state to the on state.
2. The DC-DC converter control circuit according to claim 1, wherein the control circuit comprises a first detection circuit which monitors a voltage of the output node and which detects whether the first switching element is in the off state based on a change of the voltage of the output node.
3. The DC-DC converter control circuit according to claim 2, wherein the first detection circuit determines that the first switching element is switched to the off-state when the voltage of the output node is low.
4. The DC-DC converter control circuit according to claim 3, wherein the first detection circuit comprises:
 - a first resistance one end of which is connected to the output node;
 - a third switching element having a first terminal which is connected to the other end of the first resistance and a control terminal to which a third voltage is supplied; and

a second resistance one end of which is connected to a second terminal of the third switching element, wherein a fourth voltage is supplied to the other end of the second resistance.

5. The DC-DC converter control circuit according to claim 4, wherein the control circuit switches the first switching element from the off state to the on state after detecting that the second switching element is in the off state when switching the first switching element from the off state to the on state.

6. The DC-DC converter control circuit according to claim 5, wherein the control circuit comprises a second detection circuit which monitors a voltage of the control terminal of the second switching element and which detects whether the second switching element is in the off state based on a change of the voltage of the control terminal.

7. The DC-DC converter control circuit according to claim 6, wherein the second detection circuit determines that the second switching element is switched to the off-state when the voltage of the control terminal of the second switching element is low.

8. A DC-DC converter, comprising:

- a first switching element having a first terminal to which a first voltage is supplied and a second terminal which is connected to an output node;

- a second switching element having a first terminal which is connected to the output node and a second terminal to which a second voltage lower than the first voltage is supplied;

- a feedback circuit which compares a voltage of the output node with a reference voltage so as to generate a first control signal, wherein the feedback circuit outputs the first control signal; and

- a control circuit to which the first control signal is inputted and which controls a second control signal to be outputted to a control terminal of the first switching element and a third control signal to be outputted to a control terminal of the second

switching element based on the first control signal so as to control on/off states of the first switching element and the second switching element, wherein the control circuit switches the second switching element from the off state to the on state after detecting that the first switching element is in the off state when switching the second switching element from the off state to the on state.

9. The DC-DC converter according to claim 8, wherein the control circuit comprises a first detection circuit which monitors a voltage of the output node and which detects whether the first switching element is in the off state based on a change of the voltage of the output node.

10. The DC-DC converter according to claim 9, wherein the first detection circuit determines that the first switching element is switched to the off-state when the voltage of the output node is low.

11. The DC-DC converter according to claim 10, wherein the first detection circuit comprises:

- a first resistance one end of which is connected to the output node;

- a third switching element having a first terminal which is connected to the other end of the first resistance and a control terminal to which a third voltage is supplied; and

- a second resistance one end of which is connected to a second terminal of the third switching element, wherein a fourth voltage is supplied to the other end of the second resistance.

12. The DC-DC converter according to claims 11, wherein the control circuit switches the first switching element from the off state to the on state after detecting that the second switching element is in the off state when switching the first switching element from the off state to the on state.

13. The DC-DC converter according to claim 12, wherein the control circuit comprises a second detection circuit which

monitors a voltage of the control terminal of the second switching element and which detects whether the second switching element is in the off state based on a change of the voltage of the control terminal.

14. The DC-DC converter according to claim 13, wherein the second detection circuit determines that the second switching element is switched to the off-state when the voltage of the control terminal of the second switching element is low.